Wetlands Field Investigation

Virginia Science SOLs

6.1, 6.7d, LS.1, LS.4b, LS.7, LS.8, LS.10c, LS.11, LS.12

Key Concepts

wetlands delineation, predominant wetland species, wetland soil characteristics, and observation, measuring and inference skills

Setting

The Meadow Farm wetlands on State Fair of Virginia grounds or other suitable site

Learning Objectives

Students will:

1. practice sampling procedures used in taking wetland inventories.
2. make observations to infer where wetland boundaries exist.
3. use keys to identify wetland plants, animals and soils.

Background Information

Information contained in the Wetlands 101: An Introduction to Wetland Science lesson should be reviewed in advance of the field day.

Materials

- The equipment for each team activity is listed on the description card.

Procedure

1. Prior to the arrival of the students, sort equipment for each small group. Run plant transect with flagging tape (in selected location) perpendicular to the watercourse (surface water flow) of the wetland. Place survey flags (marked with numbers 1-5) approximately every five meters, beginning with number 1, nearest the water. (The flags can be used to help secure the transect line.) The transect line should be positioned so that both upland and wetland vegetation are included with the transition occurring at about flag 4.

2. Position the pre-made soil profile model in an area where a group of 5 students will have ample room to operate. The station leader will also prepare the soil sample taken with an auger for students to examine.

3. Position flags marked “First Impressions” and “Watercourse” uphill at a location that gives the groups a comprehensive overview of the wetlands.

4. After welcoming students, remind them that the state fairgrounds is in the York River watershed which is known for its abundant wetlands. At this station, we will focus on the three indicators of a wetland: specific hydrology, plant and soil types.

5. Hopefully, the student groups will be aware of their “assignments” prior to arriving at the station, but it may be necessary to ***briefly*** remind them of each research team’s basic task (as described on the attached cards). Tell students, at that point they will have approximately 20-25 minutes to complete their work.

6. After releasing the students to complete their tasks, the station leader and volunteers should monitor and assist small groups as needed.

7. After calling the students back together, remind them to complete the appropriate data card and take their journals with them.

8. Collect and re-organize the equipment for the next rotation.

Debriefing Activity

In the unlikely event that there is enough time for the station leader to debrief with the students at this station, each team can be asked to summarize their results and share any comments on how productive or valuable they feel this wetland is and why.

Determining the Water Course – Field Data Card

Wetland Hydrology — the characteristics and patterns of movement of water in a wetlands. The water level is typically at, just below or just above the ground's surface, creating saturated conditions.

Equipment — clipboard, student journals, pencil with eraser, markers or colored pencils

Activity — Walk along the boundaries of the study area (as defined by your station leader) and observe the surrounding landscape. Please answer the following questions as a group on this sheet. (If flowing or standing water is not visible, look for evidence of water having been there during other seasons. It may be helpful to gather uphill of the study area, at the marker labeled for your group.)

1. Where do you think the water in this wetland is coming from?
   (Consider any adjacent upland areas, drainage ditches or pipes, recent weather, etc.)

2. In which direction does it seem to be flowing?

3. Where does it go?

4. How do you think water levels may change in this wetland throughout the year?

Please sketch a basic outline of the wetlands and mark (with lines and arrows) the course the water takes through this site.

Sketch

First Impressions – Field Data Card

Wet Meadow a type of wetland characterized by grasses, sedges, rushes and waterlogged soil that lacks standing water most of the year.

Equipment large clipboard(s) or artist's field board, student journals or poster board, pencils with erasers and markers (Instructors may elect to have students use larger drawing paper.)

Activity Make an artist's inventory of the wetland by describing and illustrating the prevalent colors, shapes and textures associated with the most apparent living and non-living components of this wetland. Position yourselves on upper ground so that you can view the study area as a whole. (A marker with your group name will be placed at a suitable vantage point.) Use the art materials provided to capture the overall landscape and 3-4 focal points (key plant or animal species) to which your eyes are drawn. As a group, you can decide which 1-2 people complete the sketch while the rest describe the scene and provide ideas. Each main part of the final drawing can be labeled with descriptive words for clarity.

Please write the answer to the following questions in the caption of your picture:
What did you use to represent the boundary of the wetland?
Are the plants distributed randomly or does there appear to be a pattern?

Sketch

Wetlands Cafe – Field Data Card

Food Chain

An inter-relationship in an ecological community where food energy passes among organisms. Powered by the sun, the food chain begins with plants (primary producers) and moves through a series of tropic levels, "ending" with a top predator and/or scavenger.

Equipment

assorted field guides (birds, insects, tracks) hand lens, bug boxes, clip boards, student journals, pencils

Activity

As a group, walk along the wetland borders and look for signs of animal life. Due to the presence of people, you will probably find less direct evidence of wildlife (seeing the animal itself) than indirect evidence (burrow holes, animal tracks, a feather, droppings, etc.). Your group may however, just quietly watch the tops of the grasses for dragonflies or look for birds in the interior of the wetland (using binoculars if they are provided). You can also examine the base of plants and the soil around them for insects. ***Do not pick up any organism that may sting or bite you.*** Once you have found a sign of an animal or observed an organism from afar, answer the following questions below:

1. What type of organism is it? or What organism left the sign?

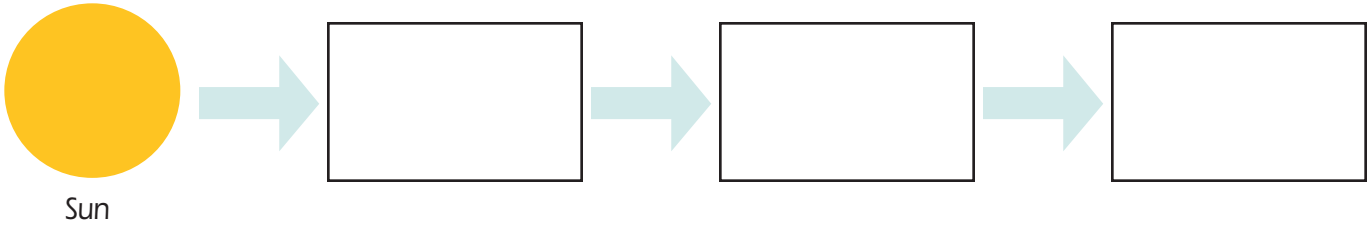
2. What stage of its life cycle do you think it is in?

3. Where specifically did you find the organism or the evidence?

4. What component(s0 of habitat (food, water, shelter, space) do you think the wetlands provide the animal?

5. Is your organism a predator or prey or both?

Using your organism for one of the levels (boxes) complete a wetlands food chain to which it may belong.



Dig It! – Field Data Card

Hydric Soil Soil characterized by and showing the effects of the presence of water

Equipment previously made wetlands soil color chart, clipboard, student journals, pencil, markers or colored pencils, meter stick, ruler, soil profile model, soil sample drawn from this site

Activity Your station leader will direct you to the location of a pre-made model which you can observe and measure and a sample from the site which you can touch.

As a group, complete the activities and answer the following questions using the profile provided:

1. Is the soil the same from top to bottom or are there distinct layers?
2. If there are layers, use your meter stick to measure each one and record it's length
3. Record any differences in soil color (use your wetlands soils color chart for terminology) Is there any mottled coloring?
4. Do you think this sample came from a wetlands?
5. Using the soil from the auger, pinch the soil from different layers between your fingers and feel the texture – is it rough or smooth?
6. Does the soil seem to be higher in organic matter or mineral content (sand, silt and clay) Note any differences between layers.

Please complete a basic sketch of the profile and the sample from the auger.

Go Green! – Field Data Card

Hydrophytic Plant a plant that is adapted to life in wet soil

Equipment clipboards, pencils, soil moisture meters, hula hoops, student journals, wetland plant key

Activity Your station leader will direct you to the wetland transect (marked line along which scientific sampling or surveying is completed) you will use. Adjacent to the line at approximately five meter intervals will be survey flags. Each member of the team will be assigned a different study area corresponding to a flag. Note the flag number of your assigned study area so your data is entered in the appropriate box. flag number 1 will be closest to the main watercourse and flag number 5, the furthest. You will be counting the plant types in a standard hula hoop (provided by your station leader.) For example if there are five clumps of grass, three of one type and two of another, there are still five grasses. Also please use a soil moisture meter and record whether the soil in your study area is dry, wet or moist. Please note that you may need to share the meter with other students.

Use the following descriptions to answer the questions and complete your data card:

Grasses **–** have stems that are hollow between the joints (or nodes) and long, narrow leaves with parallel veins that come off the stem in opposite directions.

Sedges **–** resemble grasses but have solid stems that appear triangular in cross-section. Leaves come off the stem in three directions.

Rushes **–** have solid round stems.

Forbs **–** generally have broad leaves with net-like veins. The stems are solid or spongy and die back each year.

Woody Plants **–** including both shrubs (under 13 feet in height with multiple woody stems) and saplings under 13 feet in height with one main woody stem (a young tree).

Wetland Plants Data

Plant Group	Flag #1 Soil Moisture Level _____	Flag #2 Soil Moisture Level _____	Flag #3 Soil Moisture Level _____	Flag #4 Soil Moisture Level _____	Flag #5 Soil Moisture Level _____	**Total**
Grasses						
Sedges						
Rushes						
Forbs						
Woody Plants						

1. Using the wetlands plant key try to identify one plant in your hula hoop and list its name here.

2. Examine your teammates data and look for patterns. Were certain plants found close together? Did the distance from the main watercourse affect the plant composition?

3. Did soil moisture level appear to influence plant composition?